Planetary Science Strategy for Technology Investment

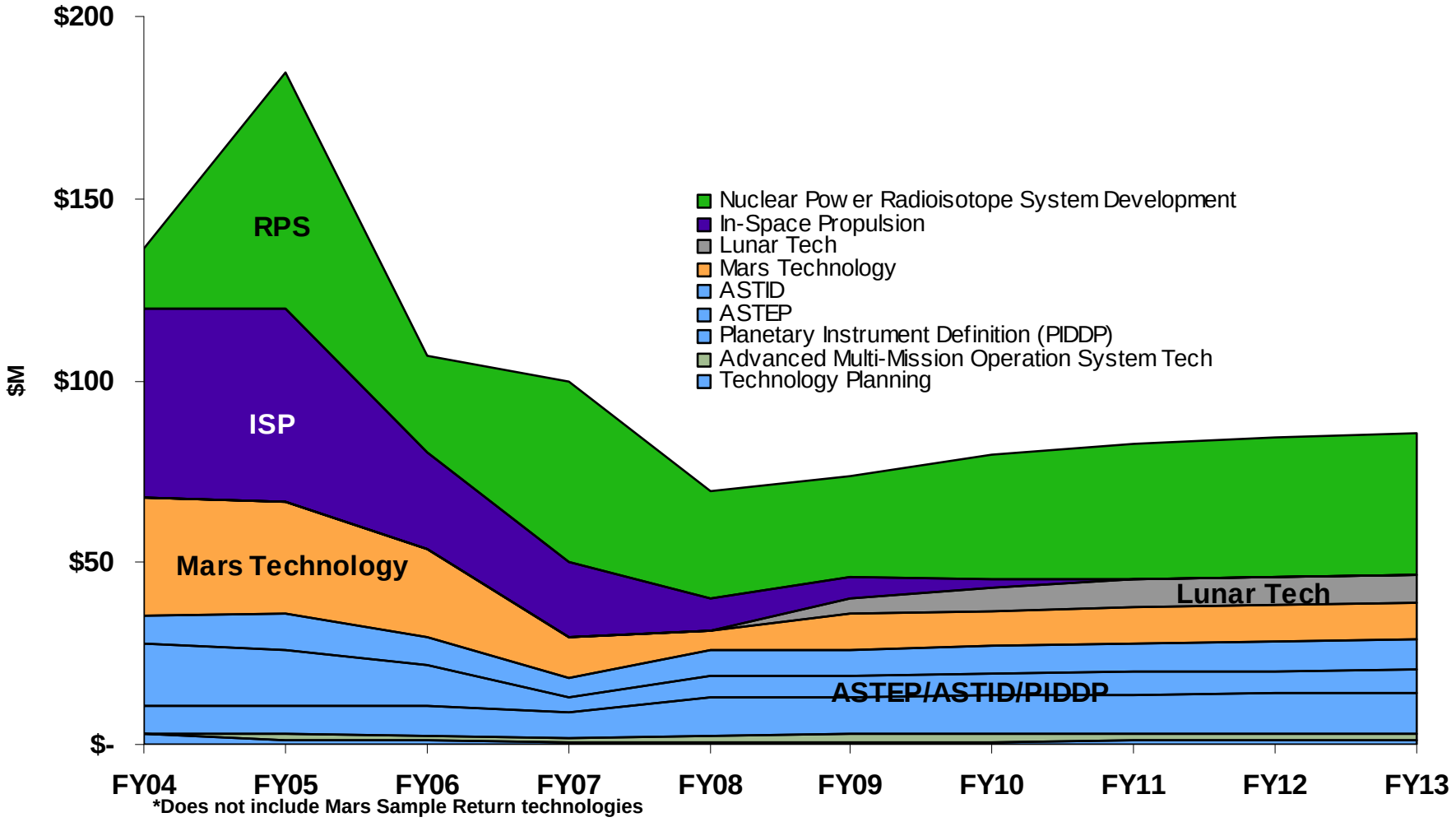
Jim Adams
Deputy Director
Planetary Science Division
NASA Headquarters

Doug McCuistion
Director, Mars Exploration Program
Planetary Science Division
NASA Headquarters

Planetary Science Agenda

- Maintain a Healthy Mars Exploration Program
- Continue remarkable Discovery and New Frontiers Programs
- Prepare for our next Flagship mission
  - Outer Planets Flagship
  - Mars Sample Return
- Emphasize sample return from all targets
- Expand Lunar science and use Lunar Missions as a “tech demo space.”

Planetary Technology Budget



*Does not include Mars Sample Return technologies

Limited Resources Demands Adoption of a Technology Pull Strategy

Adjusting Investment Strategies

- Finish what's been started
  - If the need remains demonstrated
- Create Flight Opportunities
  - To push the investment to TRL 7
  - Lack of NMP creates challenge and opportunities
- Most Planetary Science opportunities will be on competed missions for the foreseeable future
  - Examining ways to relieve the "competition risk"
  - Possible Step 1 BYE for PSD Defined Tech. Identified in the AO

Planetary Science Tech Emphasis

- Radio Isotope Power Systems
  - Advanced Stirling Cycle Generator
  - Small Surface RPS Units (~70Watts)
- Propulsion Systems
  - Lightweight High Thrust
  - Advanced Chemical
  - Ion Propulsion
- Aerocapture
- Pinpoint Landing Systems
- Seismometers & Heat Flow Instruments
- Optical Communications
- Fault Protection and Management

Pulling Technology

- Encourage Infusion into Competed Missions
- Discovery AO 2009 -- Possible GFE ASRG for Mission Enabling Approaches
  - DSMCE studies will identify possible category 1 class science that is enabled by ASRG on a Discovery budget
  - 9 studies awarded from 40 proposals for a range of missions to the inner solar system (Venus), the Lunar surface, small bodies, and outer planet moons
  - Studies will report results in December 2008, and provide guidance to the ASRG development specifications to ensure multi-mission capability
- New Frontiers-3 AO 2008 -- Cost Sharing for Advanced Chemical and Ion Propulsion
- LADEE -- Possible Flight Opportunity for Optical Communications Demonstration
- Lunar Geophysical Network Landers
  - Examining Potential of Small Surface RPS
  - Pinpoint Landing System Demonstrations

Future is Good

- Short on resources but non-trivial budget
- Actively pursuing technology pull
  - Technology research efforts must demonstrate mission need
- Need to finish what we've started
- As current efforts reach TRL 6/7, more longer term investments can be made